factors in determining the succession. The probable history of the heath is well discussed and the diagrams are decidedly good and appropriate.

A remarkable instance of the vitality of moss protonema is recorded by BRISTOL,[6] who found resting protonemal cells, rich in oil, in dry soil stored in air-tight bottles for 46–49 years. In cultures these grew and produced protonema of the ordinary type.

In a series of notes WEST[7] has recorded the bryophytes and lichens found upon trees in parts of Scotland, Wales, and Ireland, and has arranged them according to abundance. He has found the percentage ratio of some of the principal forms to be: *Stereodon cupressiformis* 16, *Parmelia saxatilis* 6, *Isothecium myosuroides* 2, *Frullania dilatata* 2, *Parmelia fuliginosa* 2, *Lecanora tartarea* 2, and *Platysma glaucum* 1.—GEO. D. FULLER.

Variations in wood structure.—Several recent articles have called in question some of the "laws of Sanio" for variation in the size of tracheids in conifers, more particularly that law which states that tracheids increase in size from the pith radially outward until they reach a definite size, which remains constant for the following annual rings. SHEPARD and BAILEY[8] found the gradual increase in size up to 30–60 years, but in succeeding years no constant length was attained. Later the same authors maintained their points in this journal.[9]

Their results were for the greater part confirmed by a detailed study of *Pinus palustris* and *Pseudotsuga* by Miss GERRY,[10] who also finds the longest tracheids in the early spring wood and the shortest in the late wood. LEE and SMITH[11] now supplement this with an extended study of *Pseudotsuga* from British Columbia. Their results, in general, agree with those already cited except that after a gradual and fairly rapid increase up to the age of 50 years the tracheid length varies comparatively little, but tends to increase slightly. They also find an increase in tracheid length up to 42 ft. above the ground, and then a gradual decrease up to 154 ft., where the measurement ceased. It is interesting also to note that trees from the coast region appear to have slightly longer tracheids than those from the mountains.

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[7] WEST, W., Ecological notes; chiefly cryptogamic. Jour. Linn. Soc. **43**:57–85. 1915.

[8] SHEPARD, H. B., and BAILEY, I. W., Some observations on the variation in length of conifer fibers. Proc. Soc. Amer. Forest. **9**: 1914.

[9] BOT. GAZ. **60**:66–71. 1915.

[10] GERRY, ELOISE, A comparison of tracheid dimensions in longleaf pine and Douglas fir. Science **43**:360. 1916.

[11] LEE, H. N., and SMITH, E. M., Douglas fir fiber, with special reference to length. Forest Quart. **14**:671–695. 1916.

Extending their work to angiosperms, TUPPER and BAILEY[12] found the average length of their wood elements to be twice that of the corresponding structures in gymnosperms except in the vesselless angiosperms, *Tetracentron*, *Trochodendron*, and *Drimys*, which seem to have the typical gymnospermous length of wood elements. More recently, PRITCHARD and BAILEY[13] examined *Carya ovata* and reached the general conclusion that both in conifers and in woody dicotyledons there is a period in the early stages of the life history during which the woody elements increase in size comparatively rapidly, the length of the period varying in different groups. Furthermore, different types of xylem elements, such as tracheids, wood fibers, and vessel segments, behave very differently, but their size generally fluctuates more or less during the later stages of the development of the stem.—GEO. D. FULLER.

Taxonomic notes.—COOK[14] has made a comparison of the peculiar branching and flowering habits of Cacao (*Theobroma cacao*) and Patachte, formerly referred to *Theobroma*, but recently made the basis of a new genus (*Tribroma*) by COOK.[15] The comparison deals with morphological and ecological features of the two genera, as exhibited under cultivation in eastern Guatemala.

GREENMAN[16] has described a new species of *Senecio* (*S. Hollickii*), collected by BRITTON and HOLLICK in Jamaica in 1908.

GROVE[17] has described, along with other new fungi, a new genus (*Diploöspora*) of Ascomycetes.

ORTON[18] has monographed the North American species of *Allodus*, a genus of Uredinales whose most conspicuous feature is the frequent close association of aecia and telia on the same plant parts, and the absence of distinct uredinia. The most interesting fact in connection with its host relationships is that no host occurs among the Rosales. There are 47 species recognized, including 4 new species and 20 new combinations.

SPRAGUE and HUTCHINSON,[19] in connection with a report upon a collection of African Anonaceae, call attention to the great increase in our knowledge of

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[12] TUPPER, W. W., and BAILEY, I. W., The secondary xylems of gymnosperms and angiosperms. Science **43**:323. 1916.

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[15] Jour. Wash. Acad. Sci. **5**:288. *pls. 46–50, 52, 54*. 1915.

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[18] ORTON, C. R., North American species of *Allodus*. Mem. N.Y. Bot. Gard. **6**:173–208. 1916.

[19] SPRAGUE, T. A., and HUTCHINSON, J., African Anonaceae. Kew Bull. no. 6. pp. 145–161. *figs. 3*. 1916.